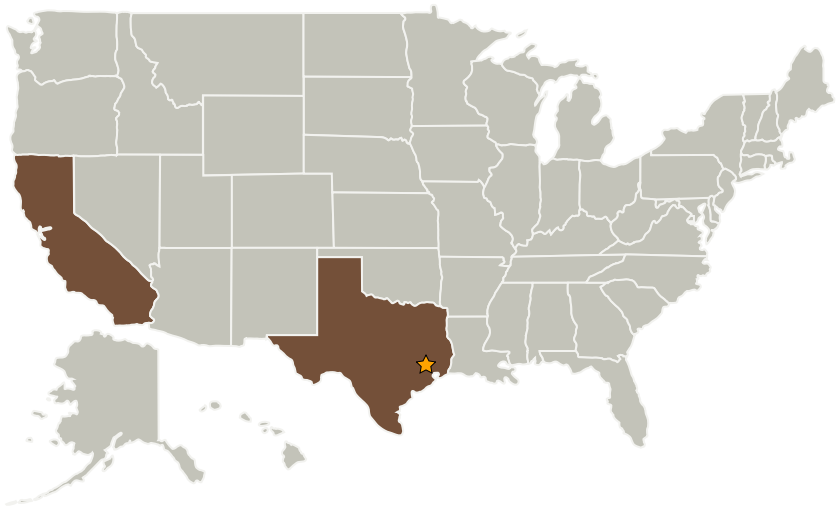
Lunar Autonomous Automatic Surface Navigation System, Phase I

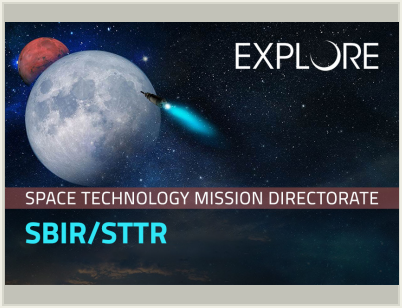
Completed Technology Project (2009 - 2009)

Project Introduction

To address the NASA GRC Laboratory need for navigation capabilities to provide location awareness, precision position fixing, best heading, and traverse path planning for planetary EVA, manned rovers, and lunar surface mobility units, Physical Optics Corporation (POC) proposes to develop a new Lunar completely Autonomous Automatic Surface Navigation (LAAN) system. This system will incorporate a POC-developed highly-efficient miniature self-mixing interferometric speedometer sensor, POC's proprietary tunable liquid crystal lens autofocusing system, and a robust prediction tracking algorithm that will enable us to meet NASA lunar mission requirements. The LAAN system will offer position accuracy better than 2.5 m with 95% probability per 0.5 hr of motion without interaction with other positioning systems, and be compact (less than 10 cubic in.), lightweight (less than 8 oz), and consume less than 0.5 W. In Phase I, POC will demonstrate the feasibility of LAAN by creating and testing a preliminary prototype, which will demonstrate TRL-4 by the end of Phase I. In Phase II, POC plans to develop a fully functional prototype and demonstrate its complete feasibility (TRL-6). The results will offer NASA capabilities to provide better navigation for lunar mobile units during creation of scientific, industrial, and transport facilities, space monitoring stations, etc.

Primary U.S. Work Locations and Key Partners





Lunar Autonomous Automatic Surface Navigation System, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Lunar Autonomous Automatic Surface Navigation System, Phase I

Completed Technology Project (2009 - 2009)

Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Physical Optics Corporation	Supporting Organization	Industry	Torrance, California

Primary U.S. Work Locations	
California	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.1 Sensing and Perception
    - TX04.1.2 State Estimation